

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), April-May 2015

B. Tech. in Computer Science & Engg., Semester VI



Roll No.....

CSE 604: Software Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

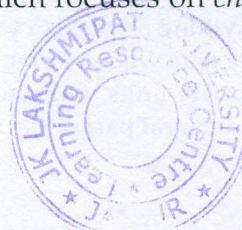
Q.1A Attempt all questions (10 questions @ 1 mark)

10

- i. If you were a lead developer of a software company and you are asked to submit a project/product within a stipulated time-frame with no cost barriers, which model would you select?
(a) Waterfall (b) Spiral (c) RAD (d) Incremental
- ii. Select the incorrect statement: "Software engineers should
(a) not knowingly accept work that is outside your competence."
(b) not use your technical skills to misuse other people's computers."
(c) be dependent on their colleagues."
(d) maintain integrity and independence in their professional judgment."
- iii. Efficiency in a software product does not include _____
(a) responsiveness (b) licensing (c) memory utilization (d) processing time
- iv. As per an IBM report, "31% of the project get cancelled before they are completed, 53% overrun their cost estimates by an average of 189% and for every 100 projects, there are 94 restarts". What is the reason for these statistics?
(a) Lack of adequate training in software engineering
(b) Lack of software ethics and understanding
(c) Management issues in the company
(d) None of these
- v. State true or false

Company has latest computers and state-of-the-art software tools, so we shouldn't worry about the quality of the product.
- vi. Select the option that suits the Manifesto for Agile Software Development
(a) Individuals and interactions (b) Working software (c) Customer collaboration (d) Responding to change (e) All of the mentioned
- vii. Which three framework activities are present in Adaptive Software Development (ASD) ?
(a) analysis, design, coding

	(b) requirements gathering, adaptive cycle planning, iterative development (c) speculation, collaboration, learning (d) none of these
viii.	The work associated with software engineering can be categorized into three generic phases, regardless of application area, project size, or complexity namely the _____ phase which focuses on <i>what</i> , the _____ phase which focuses on <i>how</i> and the _____ phase which focuses on <i>change</i> . i. support ii. development iii. definition (a) 1, 2, 3 (b) 2, 1, 3 (c) 3, 2, 1 (d) 3, 1, 2
ix.	Grady Booch, James Rumbaugh, and Ivar Jacobson combined the best features of their individual object-oriented analysis into a new method for object oriented design known as (a) HTML (b) XML (c) UML (d) SGML
x.	Throughout the OOD process, a software engineer should look for every opportunity for creating new design process. (a) True (b) False

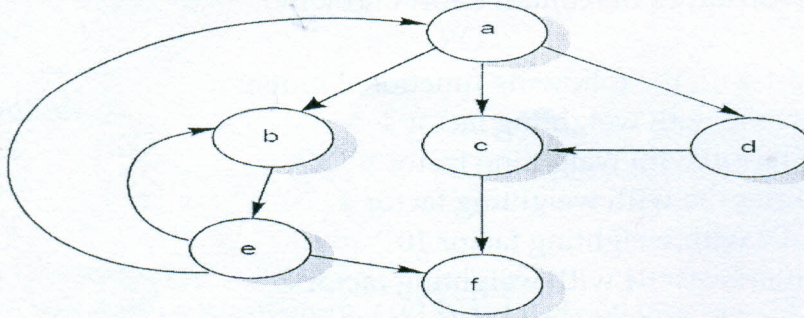


Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	What is software metric	
ii.	Describe agility (for software projects) in your own words.	
iii.	Mentions some software analysis & design tools	
iv.	What is the difference between function oriented and object oriented design?	
Q.3A	What is software engineering? Describe the characteristics of a software contrasting it with the characteristics of hardware.	05
Q.3B	What do you understand with the term "requirements elicitation"? Discuss the techniques used in the process of requirement elicitation.	05
Q.4A	Explain the role of functional independence, coupling and cohesion with respect to modular design.	05
Q.4B	If some existing modules are to be re-used in building a new system, which design strategy is used and why?	05
Q.5A	What is software testing? Differentiate between • alpha testing & beta testing • functional & structural testing	05

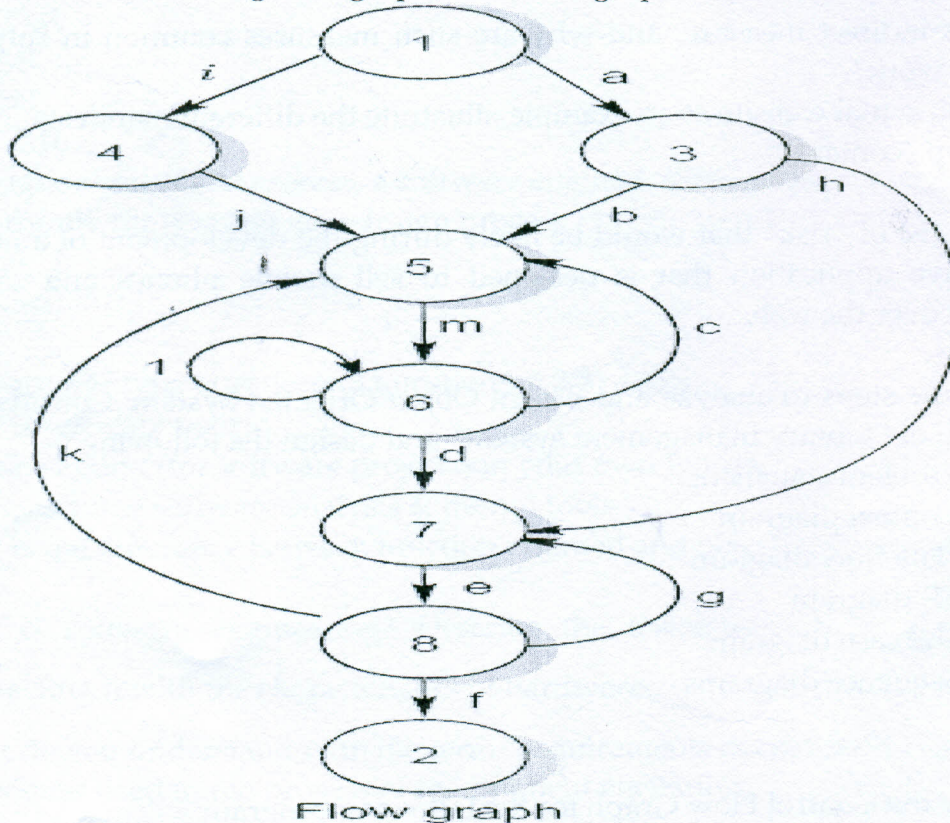
Q.5B	What is meant by the term 'modularity' in the context of software design? Why is modularity considered desirable?	05
Q.6A	Discuss the various modes of software development that are considered in the COCOMO model. A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project. (Note: $a_b = 3.0$, $b_b = 1.12$, $c_b = 2.5$, $d_b = .35$)	05
Q.6B	What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why?	05
OR		
Q.6B	Consider a project with the following functional units: No of user inputs=50 with weighting factor 4 No of user outputs=40 with weighting factor 5 No of user enquiries=35 with weighting factor 4 No of user files=06 with weighting factor 10 No of external interfaces=04 with weighting factor 7 Assume all complexity adjustment factors are average. Compute Function Point.	05
Q.7A	What is indirect measure, and why are such measures common in software metrics work?	05
Q.7B	Using an actual website as an example, illustrate the different manifestations of WebApp "content".	05
OR		
Q.7B	Make a list of "risk" that would be likely during the development of a new e-commerce application that is designed to sell mobile phones and service directly over the web.	05
Q.8A	Define the steps to analyze and design Object Oriented System. Consider the problem of "Library management system" and design the following: • Problem statement • Context diagram • Data flow diagram • ER diagram • Use case diagram • Sequence diagrams	10
Q.9A	(i) Draw the Control Flow Graph for the following program: <pre> { int sum, i; sum=0; i=1; while(i<=x) { </pre>	10

```
sum=sum+i;
i=i+1;
}
printf("%d", sum);
```

(ii) Consider following flow graph, calculate the Cyclomatic complexity by all methods and also find the independent paths :



(iii) Consider following flow graph, Draw the graph and connection matrices:



Flow graph

Q.9B For a project of 100000 LOC embedded system, compare the efforts and time duration and find out the effort variation and time variation if 10

- Highly capable programmers but very little experience in programming language (PCAP=.86, LEXP=1.14)
- Programmers of the low quality but a lot of experience with programming language (PCAP=1.17, LEXP=.95)

(Note: $a_i = 2.8$, $b_i = 1.20$, $c_i = 2.5$, $d_i = .32$)

OR

I. Screen edit II. Command Language Interpreter III. File Input & Output IV. Cursor Movement V. Screen Movement

The size of these are estimated to be 4k, 2k, 1k, 2k and 3k delivered source code lines. Use COCOMO to determine:

1. Overall cost and schedule estimates
2. Cost & Schedule estimates for different phases.

Note: Given significant cost drivers are

- i. Required software reliability is high, i.e.,1.15
- ii. Product complexity is high, i.e.,1.15
- iii. Analyst capability is high, i.e.,0.86
- iv. Programming language experience is low,i.e.,1.07
- v. All other drivers are nominal



Table: Effort and schedule fractions occurring in each phase of the lifecycle

Mode & code size	System Design	Detail Design	Module code & test	Integration and test
	μ_p			
Organic Small $S \approx 2$	0.16	0.26	0.42	0.16
Organic medium $S \approx 32$	0.16	0.24	0.38	0.22
	τ_p			
Organic Small $S \approx 2$	0.19	0.24	0.39	0.18
Organic medium $S \approx 32$	0.19	0.21	0.34	0.26